

BULLETIN No. 1

FRESNO STATE NORMAL SCHOOL

PLAYGROUND APPARATUS

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Playground Apparatus

BY

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WITH AN ARTICLE ON

The Playground Movement in Rural Schools

BY

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TOGETHER WITH AN ARTICLE ON

Suggested Combinations of Apparatus

BY

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Giant Stride.



Teeter Boards.

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INTRODUCTION.

Among school people, the playground movement is constantly assuming a more important position. The modern world is coming to realize that play is an element, particularly in child life, which the public should foster and provide suitable means for its development. To this fact is due the comparatively recent growth of large playground centers in many cities of the United States. When a playground has been created there at once arises the necessity of properly equipping it with suitable apparatus. It is not enough merely to provide space for play, but appliances of considerable variety must be installed. A large line of apparatus is being made and widely advertised by several manufacturers, most of it built of iron and steel. For the most part it is excellent, and where possible, it is probably wise to purchase this sort of equipment. It is practically indestructible and is strong and safe. However, for a considerable number of town and rural schools, the first cost of steel apparatus is so great that it is practically prohibitive. It is to meet this condition, that the present bulletin has been issued. In the designs submitted, three things have been constantly kept in mind: simplicity of construction, strength and durability of the finished projects, and low initial cost. Two of the projects have been made and are now in operation on the Normal School grounds. The Normal School is desirous of being helpful in this matter and invites school authorities to avail themselves of any aid that may be given.

These plans have been made with particular reference to California conditions. With slight modifications they can be made applicable to any locality. For example, crude oil is herein recommended for use as a wood preservative, because of its abundance and cheapness. Elsewhere other substitutes may be employed.

In making these designs I have received valuable suggestions from a number of business and professional men of Fresno. I am especially indebted to members of the faculty of the Fresno State Normal School for help and suggestions.

W. B. GIVENS.

September 15, 1914..

THE PLAYGROUND MOVEMENT IN RURAL SCHOOLS.

By C. L. PHELPS.

As the meaning of play from an educational point of view comes to be better understood, more attention is given to the direction of children's activities. It is a long stride from the notion that play, at best, is a means of wasting time to the conception of it as an important factor in the training of children to become responsible and efficient adults. The Pietists considered play an institution of the devil and the school-master's conception of it had undergone little change in the time of Charles Dickens and Charlotte Brontë according to their stories of their own school life.

It was not until after Hall, Groos, and others had expounded their theories of play that the numerous problems growing out of the spontaneous activities and organized sports of children began to receive serious attention. Perhaps the popular writings of Jacob Riis and John Spargo, who so faithfully depicted the condition of the children of the slums, did as much as anything else to develop the play idea. Philanthropists became interested in the wronged offspring of their fellowmen and began to provide means of rescue for these children whose only playgrounds were the filthy alleys and the crowded streets. Fresh air colonies with ample facilities for play were founded and children from the worst conditions were selected and given a glimpse of real life under the best conditions that a country district could afford.

There was little of lasting value to the children themselves in these early experiments, but the people who were conducting them and those who were observing them were learning something. Among the most valuable lessons learned was the fact that no matter how degraded a child may be he instinctively responds to certain activities. The worst boy of the slums was often the most satisfactory one in a properly conducted camp where he had regular duties and took part in the sports. The George Junior Republic soon followed to prove beyond question the truth of these first observations.

It seems strange that profound educational truths are so often discovered by experiments on inferior classes of people. But such has been the case in at least two striking instances in this country within the last generation. The first instance is the vocational training which was devised after the emancipation of the slaves, presumably, as an inferior type of education for an inferior race. The second instance is the directed activities of the slum waifs which set educators to studying anew the possibilities of play. Since then books on play have been written from a different point of view, plays and games have been

studied and tabulated with reference to the special needs of different types and grades of children, and supervision of play has become an important part of the training of children on the public playgrounds and in the schools of the cities.

Due to these things play conditions in the schools of the cities have been remarkably improved in recent years. Many of the school playgrounds in the larger cities are covered with cinders and fitted up with apparatus, making a kind of outdoor gymnasium. Some are divided into sections for larger and smaller pupils, thus making play more satisfactory to the children and supervision easier for the teachers.

On the other hand the playgrounds of our country school districts have received but little attention. Most of them are simply bare, open spaces of ground where the children can assemble and use their own ingenuity to devise means of play. From the standpoint of exercise only, country school children do not suffer on account of lack of facilities for play as much as city children do. But in another way they suffer more. In many ways outside of school, city children get systematic training in team work, sharing responsibility, co-operation, and fair play, which country children do not get because of their isolation. The school is practically the only place where they have a chance to get such training. If the school neglects it they fail to get it.

The trouble in the past has been that facilities have not been provided on the school grounds for systematic training of children in their outdoor activities and teachers have not been able to make it a success without them. What the country teacher needs is some suggestive helps, both in the matter of plays and games and playground apparatus. Fortunately for the development of rural schools such helps are rapidly becoming available. Such standard books as Johnson's "Education by Plays and Games" and Bancroft's "Games for the Playground, Home, School and Gymnasium," ought to meet the needs of most teachers in so far as plays and games are concerned. In the matter of apparatus, there are certain simple pieces that are invaluable to a playground that can be provided at a nominal cost. A sand pile for the primary grades can usually be secured in country places without expense. A pit for the running-broad and high jumps can be made by the larger boys. Other things that cost a small sum, can be secured by donation or by some sort of an entertainment.

But on a larger scale the development of playgrounds for rural schools needs scientific planning. The activities of children need to be directed in such a way as to prove most beneficial in their development. Their natural tendencies along the lines of organized effort need to be provided for. An investigation by Sheldon (*American Journal of Psychology*,

Vol. 9) of 623 organizations of boys between ten and seventeen years of age disclosed the fact that 86 per cent of them were based upon some physical activity and that 61 per cent were for the purposes of ordinary athletic sports. It is evident from this and similar studies, first, that children themselves make an effort to regulate their own activities, and, second, that the greater part of their spontaneous activities take some athletic form.

It is necessary to take these two things into consideration in dealing with the problems of the children on the school playground. School principals usually testify that playground apparatus and supervision of the children's activities on the grounds practically eliminate the worst disorder from the schoolroom. If this were the only value to be derived no further argument in their favor would be necessary. But when the social and moral values of such training are added, about the only argument that can be opposed is the very important one of expense.

Up to the present time rural districts have not been able to secure standard steel apparatus and no other kind, of a satisfactory type, was available. Besides, most rural districts have only recently begun to realize the importance of having as good schools and as good playgrounds as the cities have. It is, in fact, only recently that leaders of educational thought all over the country have been giving their attention to the problems of rural life and have been urging the necessity for making country life more attractive in order to stop the growing tendency on the part of the young people of the country districts to rush to the already congested cities in search of better advantages. The place for all to begin work is, of course, with the children. Here and there a progressive community has recognized this by creating libraries, installing well-equipped playgrounds, developing attractive social center activities, and doing other things that tend to make life in the locality enjoyable. Here and there a new schoolhouse has been built, the old one made over into a social hall, and the whole school site so developed as to be a source of pride throughout the neighborhood.

Looked at from a purely commercial point of view, communities which do such things are exercising the best of judgment and are showing the keenest of insight into their own material welfare. Dr. Cubberley, in his recent book, "Rural Life and Education," gives an instance of a rural community which greatly enhanced its material wealth, to say nothing of the elevation of its social and moral standards, through its interest in an institutional church which became the center of nearly all phases of its social life. Financial consideration is perhaps the lowest form of argument for such development. Horace Mann, back three quarters of a century ago, recognized it as such, used it, and apologized

for the necessity which made him resort to such an argument. But the truth is that it is still an important factor in all progress whether in a city or a rural district, and in the matter of educational betterment it is fortunate that its force is found on the side of progress. A comparatively small expense for the improvement of the school of a community, so that it stands out distinctly in comparison with other schools of its type, makes that community a better place in which to live and, consequently, attractive to prospective settlers of a desirable type.

The citing of instances of material advantage to be derived from the development of play facilities for children and social advantages for all at the school centers probably will need apology in a few years, but just at present there are two questions that rural school authorities are asking about contemplated improvements. One of these questions is, how will the life of the community be affected, and the other is, what will be the immediate cost. On the answer to these two questions depends the amount of progress that may reasonably be expected. The bigger question of the two, so far as most progressive movements are concerned, is the financial question.

Two kinds of studies are, therefore, clearly in order and, when made, should prove exceedingly valuable to those who have the responsibility for the development of the local rural schools. The first is a study of the present status of rural schools with reference to suitable equipment for making the most of school life, and the second is a scientific study of needed equipment with special reference to suitability and expense.

The writer is able to make a report of a small study of the first kind covering the topic of play facilities in four counties. The counties studied were Fresno, Madera, Merced, and Tulare—all located in the San Joaquin Valley in California.

Each of these counties has exhibited considerable pride in its school system and has furnished complete information on this subject and a number of others with the purpose of making such improvements as may be suggested by the display of complete results of the study.

The following display of the playground facilities of the rural elementary schools of these counties, as reported by the teachers in charge, should in no way be taken as typical of the school facilities as a whole, but rather as an indication that one of the important departments of rural school life needs further investigation and, undoubtedly, considerable improvement.

The following table, compiled from the reports of 308 schools, shows the kinds of equipment reported by the different schools and the number of schools having each kind:

Equipment.	No. of Schools.
Basket ball courts.....	58
Baseball diamonds.....	49
Swings	50
See-saws	38
Horizontal bars	26
Tennis courts	16
Volley ball courts.....	14
Croquet grounds	9
Slides	8
Giant strides	7
Traveling rings	6
Indoor baseball diamonds	6
Football grounds.....	4
Handball courts	3
Pole-vaulting outfits	3
Ladders	3
Merry-go-rounds	2
Soccer	2
Sand boxes	1
Spring boards	1
Discs	1
Cinder tracks	1

This display is not nearly what it should be but it is very different from what could have been shown ten years ago. It contains evidence that progressive rural communities are rapidly taking steps to give playground activities the recognition they deserve. The signs of the times are all encouraging and we are about to accept the opinion that Gulick expressed some years ago when he stated that "the larger understanding of the significance of recreation among our people justifies the belief that one of the topics which is surely destined to have a more prominent place in our schools in the future that it has had in the past, is this subject of play."

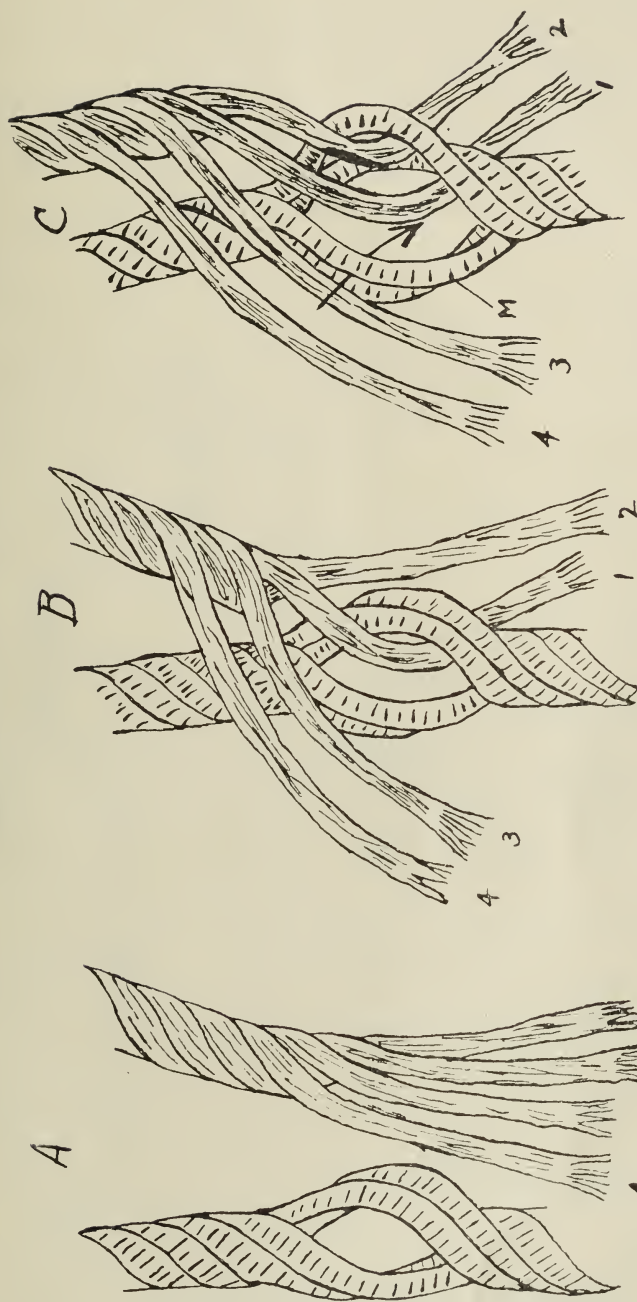
PLAYGROUND APPARATUS MADE AT SMALL COST.

In response to a seemingly strong desire on the part of many rural and town schools in the San Joaquin Valley for improved playground conditions, the following pieces of apparatus have been worked out at the Fresno State Normal School. Several schools around Fresno have made some pieces along original lines with considerable success; others have not been able to achieve such satisfactory results. Consequently, a number of teachers have expressed a strong desire for definite suggestions for undertaking such work so that persons with little or no technical training could put them to use. All the drawings herein given have been worked out with considerable attention to details so that any one may readily understand them. All materials are specified, so little difficulty should be encountered. In case difficulties do arise that appear hard to overcome, the Normal School will be ready to give such assistance as may be requested.

Rope Braiding.

In all the apparatus described in this bulletin, where rope is used no knots are made, but all joining is made by braiding or splicing. This method is much stronger and better in every way than tying knots. Four-strand rope is recommended when it can be had, as stronger than three-strand. Also, wherever a rope is fastened through an eye-bolt or over a ring producing wear, a thimble is used, thus increasing the life of the rope very much. The accompanying plate describes the method of braiding in a four-strand rope. With a little attention to the details shown, a three-strand rope can be braided in without any difficulty.

ROPE BRAIDING, FOUR STRANDS.

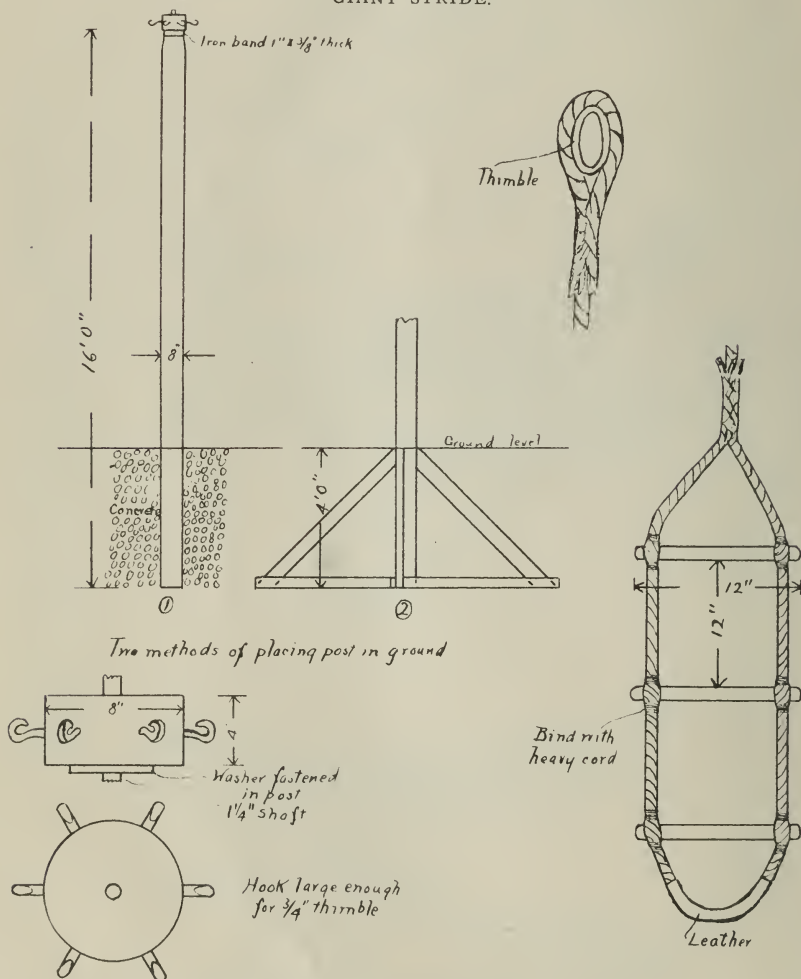


- Open up rope, as in A, where braiding is to be made. Strands at end are numbered.
1. Run strand 1 through opening in rope, as in B.
 2. Run strand 2 under upper loop only on right side, as in C.
 3. Run strand 3 under loop M (Fig. C), taking the direction of the arrow.
 4. Run strand 4 under remaining loop.
 - 5.

Giant Stride.**Materials required:**

- 1 piece redwood, 8 inches by 8 inches by 16 feet.
- 1 casting with hooks as shown, with 16-inch shaft and large washer.
- 100 feet manila rope, 4 strands, $\frac{3}{4}$ -inch.
- 6 galvanized thimbles for $\frac{3}{4}$ -inch rope.
- 18 pieces maple or oak, each $\frac{3}{4}$ inch by $1\frac{1}{4}$ inches by 12 inches.
- 6 pieces leather, $2\frac{1}{4}$ inches by 12 inches.
- 1 piece strap iron, welded into ring, $7\frac{1}{2}$ inches inside diameter.

Total cost of materials, including forging and machine work, about \$17.00.

GIANT STRIDE.

The design here offered gives a very effective piece of apparatus and one greatly enjoyed by children. Redwood is suggested for the post, because of its greater lasting qualities when placed in the ground. Its life can be still lengthened by soaking the part placed in the ground in crude oil, preferably when the oil is hot for greater penetration.

A wheel and axle might be substituted for the casting shown, especially if the wheel has iron spokes. All but six of the spokes could be cut out and the six remaining, bent into the form of hooks shown in the drawing. However, the casting itself, as here indicated, can be made in any foundry at small cost. The part of the casting resting on the washer should be machined so as to turn the more easily.

About 16 feet of rope is used to make each ladder. The bottom of the ladder should be within 32 inches or 34 inches of the ground. The pieces of oak or maple are rounded and notched as shown, and the ends pushed between the strands of the rope for rungs of the ladder. Then each end is firmly bound with heavy cord. The post and all exposed parts of the iron work, except the shaft should be painted. The shaft should be oiled occasionally.

Combination Rings.

Materials for beam of 30 feet and six rings:

- 6 pieces redwood 4 inches by 6 inches by 18 feet.
- 2 pieces redwood 4 inches by 4 inches by 16 feet.
- 2 pieces yellow pine 4 inches by 6 inches by 16 feet.
- 60 feet manila rope, four strands, $\frac{3}{4}$ -inch.
- 6 eye bolts for $\frac{3}{4}$ -inch rope, $\frac{3}{4}$ inch by 7 inches above eye.
- 12 galvanized thimbles for $\frac{3}{4}$ -inch rope.
- 6 swivels for $\frac{3}{4}$ -inch rope.
- 3 machine bolts, with washers, 1 inch by 13 inches.
- 2 carriage bolts, with washers, $\frac{1}{2}$ inch by $4\frac{1}{2}$ inches.
- 6 galvanized iron rings, 8 inches diameter.
- 2 machine bolts, with washers, $\frac{3}{4}$ inch by $6\frac{1}{2}$ inches.

Total cost of materials about \$30.00.

This piece of apparatus is highly popular among children. The joining of the beam and main props is very strong and of simple construction. In making the beam of 30 feet, take two 16-foot pieces, put together with a half-lap joint and bolt securely. It is suggested that six rings be used, four in pairs at proper distances apart, and two at wider intervals. The rings should hang about 6 feet or 6 feet 6 inches above the ground. Swivels are suggested to avoid twisting of the ropes. As before mentioned, all parts of wood placed in the ground, should be soaked in crude oil to give longer life. The ends of the rope are braided-in or spliced after passing over the thimbles.

Teeter Ladders.

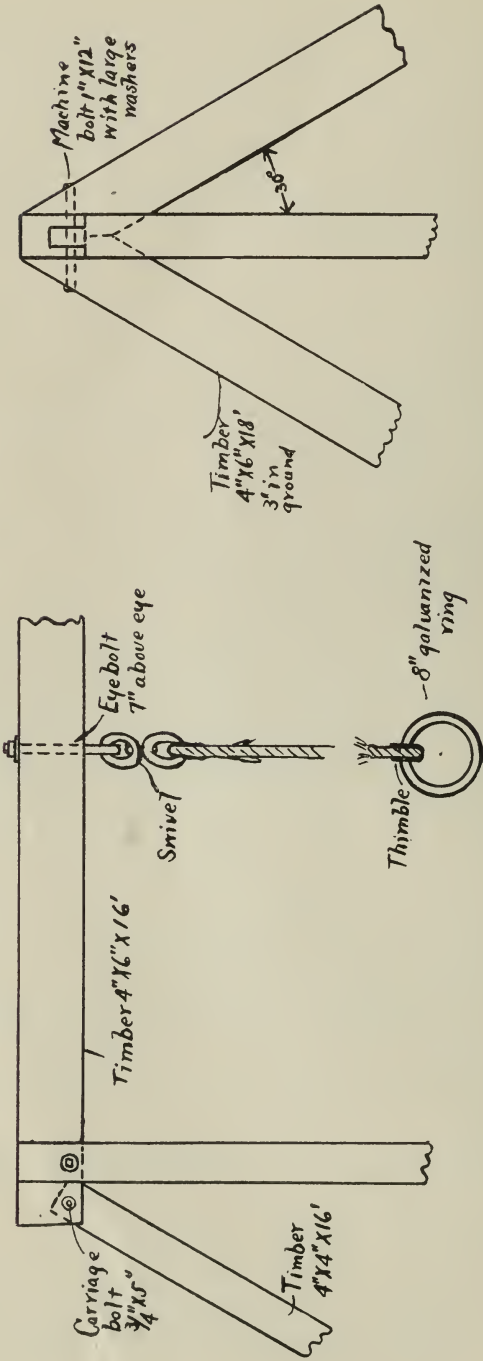
Materials for a set of three ladders:

- 3 pieces redwood, 2 inches by 6 inches by 10 feet.
- 1 piece redwood, 2 inches by 6 inches by 12 feet.
- 3 pieces redwood, 2 inches by 4 inches by 12 feet.
- 6 pieces yellow pine, 2 inches by 3 inches by 10 feet.
- 18 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches long, threaded, $3\frac{1}{2}$ inches at both ends.
- 72 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 3 pieces galvanized gas pipe, 1 inch by 25 inches long, threaded at both ends.
- 6 black lock nuts for 1-inch pipe.
- 3 pieces galvanized gas pipe, $1\frac{1}{4}$ inches by 20 inches long, threaded 3 inches at both ends.
- 6 black lock nuts for $1\frac{1}{4}$ -inch pipe.
- 16 carriage bolts with washers, $\frac{1}{2}$ inch by $6\frac{1}{2}$ inches.
- 2 machine bolts with washers, $\frac{3}{4}$ inch by 12 inches.

Total cost of materials, including cutting and threading of pipe, about \$22.00.

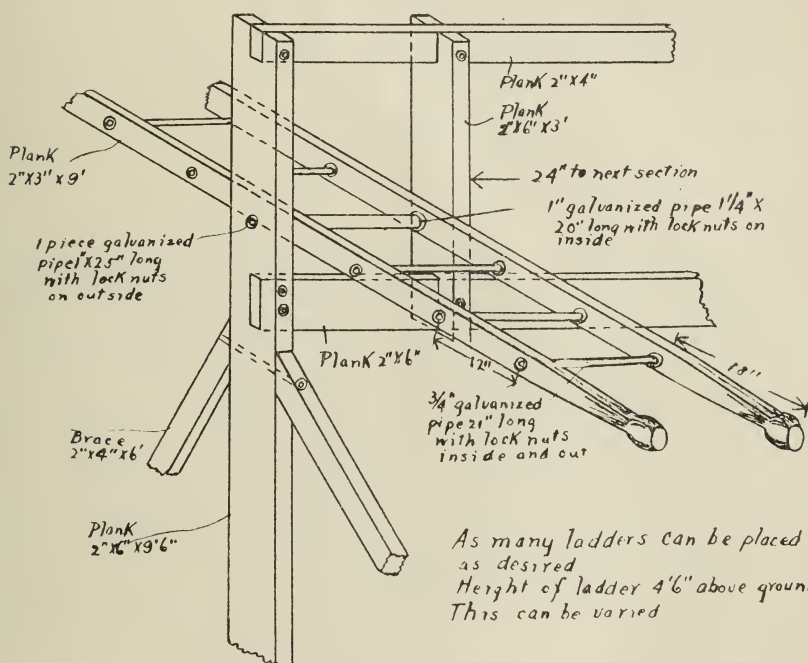
This piece of apparatus is a variation of the familiar teeter board. Ladders are suspended, on the rings of which children hang, as the ladder goes up and down. These ladders are very strong when made as suggested, with gas pipe and lock nuts.

COMBINATION RINGS.



Soak all parts of wood placed in the ground in crude oil, preferably when the oil is hot. Be sure that the pieces of $1\frac{1}{4}$ -inch pipe are reamed out sufficiently to allow the pieces of 1-inch pipe to turn easily in them.

TEETER LADDER.



*As many ladders can be placed
as desired
Height of ladder 4'6\"/>*

Slide No. 1.

Materials required:

- 2 pieces redwood, 4 inches by 8 inches by 16 feet.
- 2 pieces redwood, 2 inches by 6 inches by 16 feet.
- 2 pieces redwood, 2 inches by 6 inches by 14 feet.
- 2 pieces redwood, 4 inches by 4 inches by 8 feet.
- 1 piece redwood, 4 inches by 4 inches by 12 feet.
- 1 piece yellow pine, 2 inches by 4 inches by 8 feet.
- 4 pieces yellow pine, 1 inch by 12 inches by 18 feet.
- 4 pieces yellow pine, 1 inch by 12 inches by 8 feet.
- 1 piece yellow pine, 2 inches by 6 inches by 6 feet.
- 7 pieces yellow pine, 1 inch by 6 inches by 12 feet.
- 2 pieces yellow pine, 1 inch by 6 inches by 10 feet.
- 2 pieces galvanized sheet iron, gauge 24, 18 inches by 10 feet.
- 1 piece galvanized sheet iron, gauge 24, 18 inches by 8 feet.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 61 inches long, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 41 inches long, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches long, threaded on both ends,
one end for 3 inches.
- 4 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 2 galvanized plain tees for $\frac{3}{4}$ -inch pipe.
- 2 galvanized unions for $\frac{3}{4}$ -inch pipe.

- 1 machine bolt with large washers, 1 inch by 30 inches.
- 8 carriage bolts with washers, $\frac{3}{4}$ inch by 7 inches.
- 4 lag screws, $\frac{3}{4}$ inch by 8 inches.
- 24 carriage bolts, $\frac{1}{2}$ inch by 6 inches.
- 13 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches, threaded $3\frac{1}{2}$ inches on both ends.
- 52 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 2 pieces strap iron, $3/16$ inch by $1\frac{1}{2}$ inches by 12 inches, drilled with four $\frac{3}{8}$ -inch holes.
- 8 carriage bolts, $\frac{3}{8}$ inch by $1\frac{1}{2}$ inches.
- 2 gross wood screws, 2-inch, No. 10.
- 1 gross wood screws, $1\frac{1}{4}$ -inch, No. 8.
- 1 gross wood screws, $\frac{3}{4}$ -inch, No. 6.

Cost of materials, including cutting and threading of pipe, about \$35.00.

This form of slide is one of the most popular pieces of apparatus on the playground. The plan here suggested is quite simple and the construction is strong and well braced. Soak all parts of wood to be placed in the ground in crude oil, preferably hot oil for better penetration. In placing the sheet iron, begin with the bottom strip, fastening only at the sides close to the edge. By this means the piece above will overlap the piece below. In finishing the sides of the slide, place inside boards close down on the sheet iron and screw to the outside boards from the outside only. The method will eliminate every chance of screw points coming into the inside of the slide. Round upper edges of the side boards with care so that no splinters are left. In making the hand rails at the top of the steps, it will be found advisable to cut the gas pipe into two parts, thread the ends, and bend into shape as indicated in the drawing. Finally, to make the rail perfectly secure, a hole is drilled through the pipe and a pin placed as shown. Bolts and screws are used almost everywhere for fastening, few nails being employed.

Horizontal Bars.

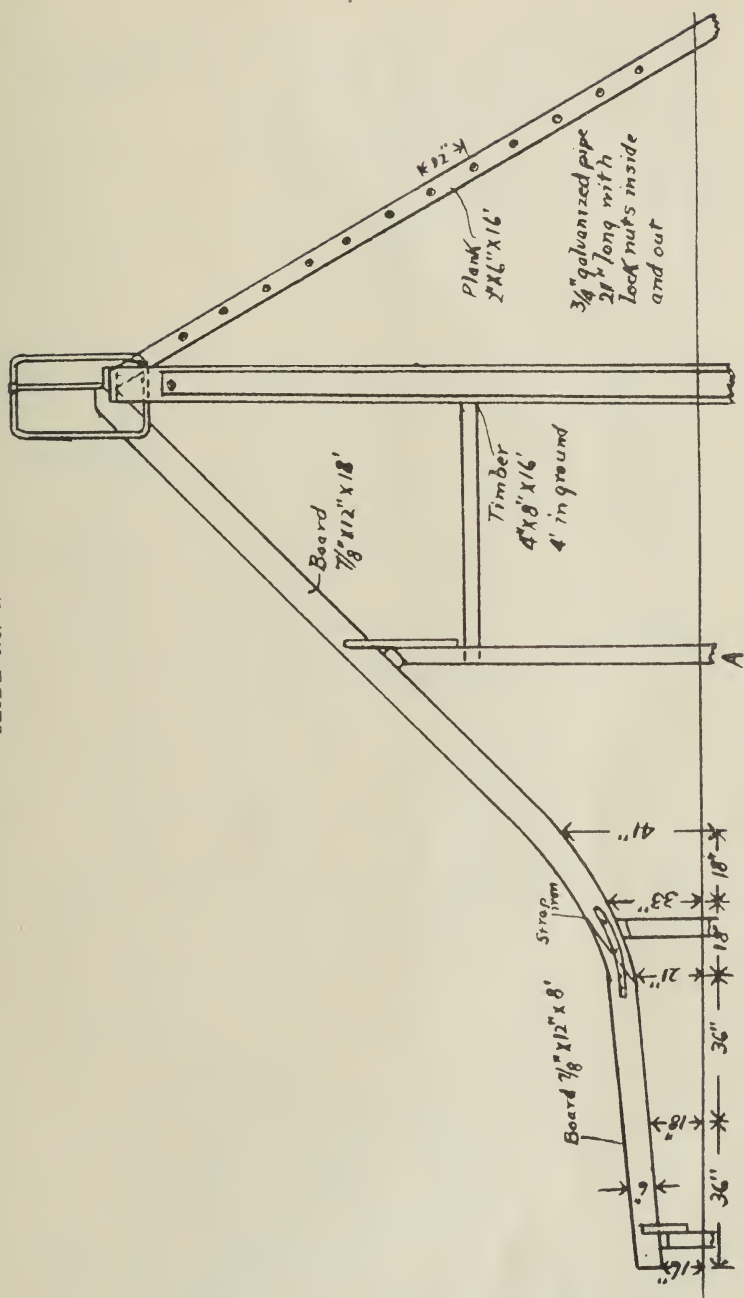
Materials required:

- 2 pieces redwood, 4 inches by 4 inches by 12 feet.
- 2 pieces redwood, 4 inches by 4 inches by 10 feet.
- 3 pieces galvanized gas pipe, $1\frac{1}{4}$ inches by 6 feet 10 inches long, threaded 6 inches at each end.
- 12 black lock nuts for $1\frac{1}{4}$ -inch gas pipe.

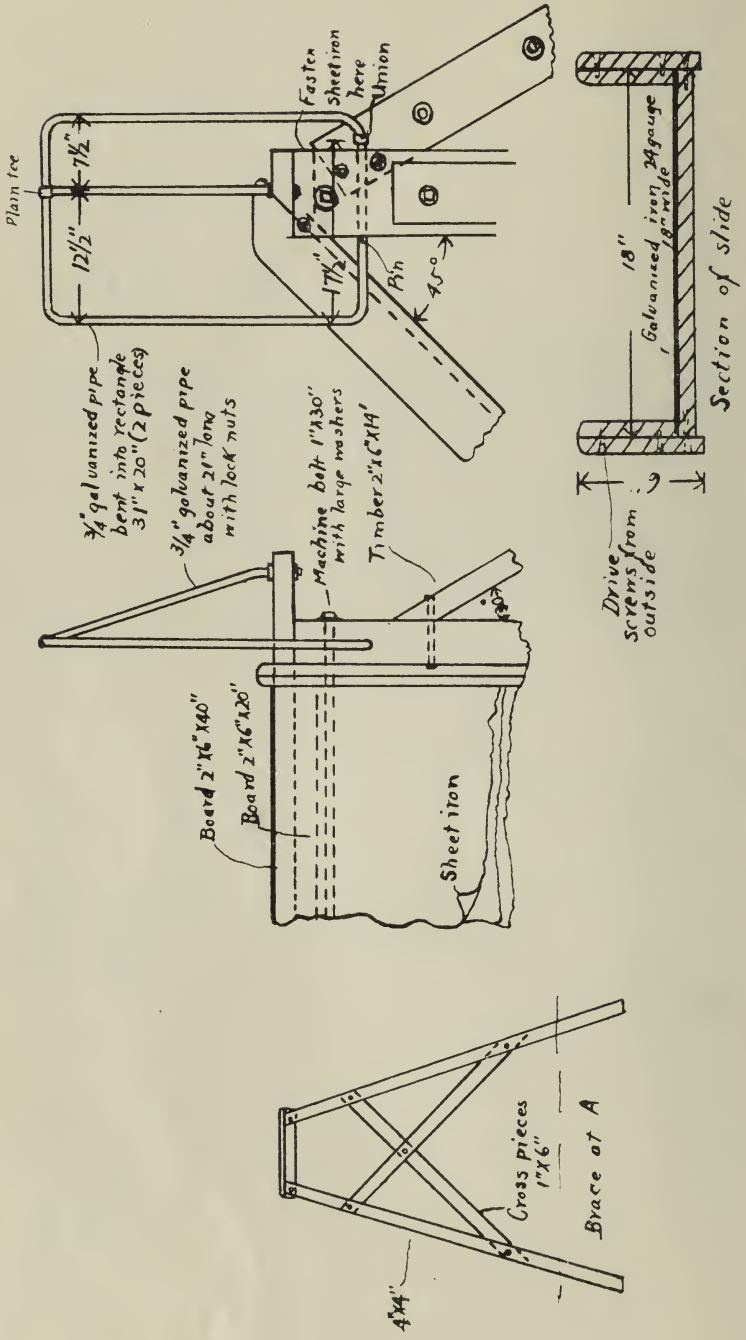
Total cost of material, including cutting and threading pipe, about \$9.50.

This simple piece of apparatus is a very attractive one to boys. The variation in height is suggested to suit boys of different sizes. Soak all parts of wood placed in ground in crude oil, preferably hot for greater penetration. The labor necessary for putting this apparatus up will be very easy, and the use of the lock nuts will make it strong.

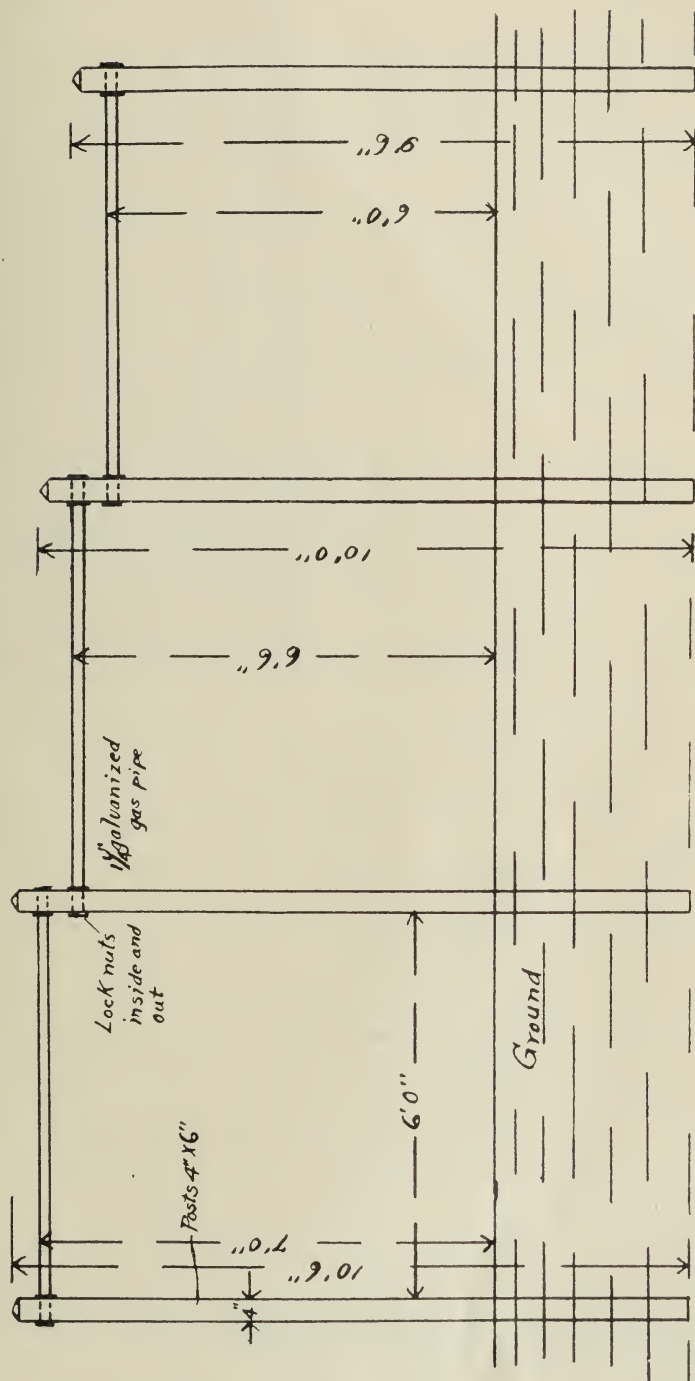
SLIDE No. 1.



DETAILS OF SLIDE No. 1.



HORIZONTAL BARS.



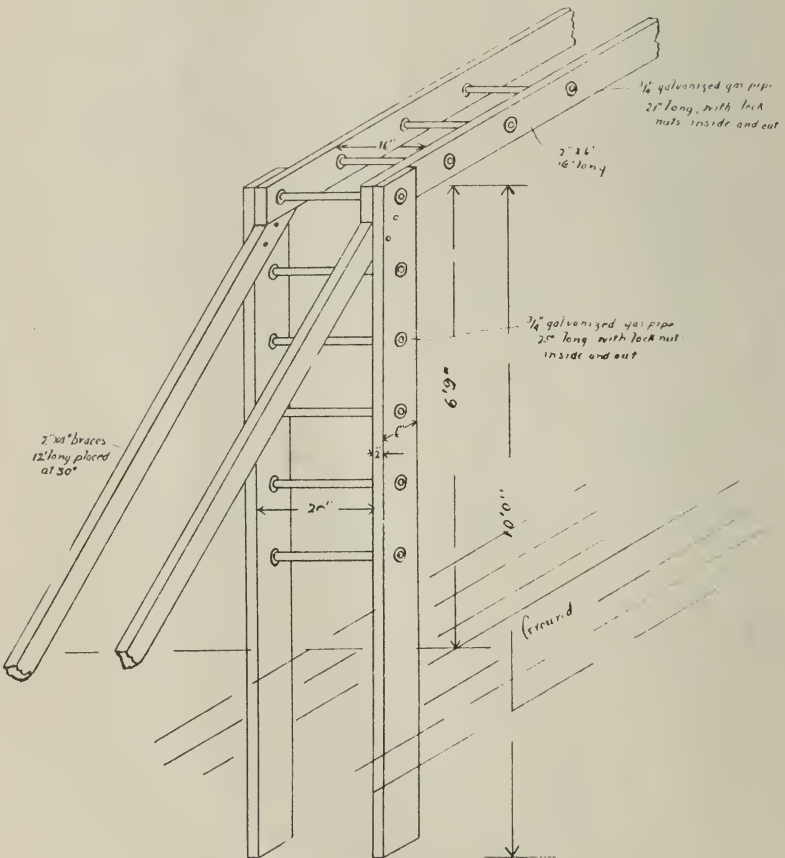
Horizontal Ladder.

Material required :

- 4 pieces redwood, 2 inches by 6 inches by 10 feet.
- 4 pieces redwood, 2 inches by 4 inches by 12 feet.
- 2 pieces yellow pine, 2 inches by 6 inches by 16 feet.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 25 inches, threaded 5 inches on each end.
- 10 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 25 inches, threaded $3\frac{1}{2}$ inches on each end.
- 15 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches, threaded $3\frac{1}{2}$ inches on each end.
- 116 black lock nuts for $\frac{3}{4}$ -inch gas pipe.
- 8 carriage bolts, with washers, $\frac{1}{2}$ inch by $4\frac{1}{2}$ inches.

Total cost of material, including cutting and threading of pipe, about \$19.00.

HORIZONTAL LADDER.



This ladder is of very simple construction. The use of the lock nuts makes the whole very rigid and strong. All parts of wood placed in the ground should be soaked in crude oil; if the oil is hot, the penetration will be the deeper. No nails are used. The braces are bolted to the uprights.

Slide No. 2.

Material required:

- 2 pieces redwood, 4 inches by 8 inches by 16 feet.
- 2 pieces redwood, 2 inches by 6 inches by 16 feet.
- 2 pieces redwood, 2 inches by 6 inches by 14 feet.
- 1 piece redwood, 2 inches by 6 inches by 2 feet.
- 1 piece yellow pine, 2 inches by 6 inches by 8 feet.
- 13 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 26 inches long, threaded $3\frac{1}{2}$ inches at both ends.
- 52 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 1 machine bolt with large washers, 1 inch by 35 inches.
- 6 machine bolts with large washers, $\frac{5}{8}$ inch by 7 inches.
- 4 lag screws, $\frac{3}{4}$ inch by 8 inches.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 61 inches long, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 41 inches long, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches long, threaded on both ends, one end for 3 inches.
- 4 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 2 galvanized plain tees for $\frac{3}{4}$ -inch pipe.
- 2 galvanized unions for $\frac{3}{4}$ -inch pipe.
- 2 pieces galvanized gas pipe, 2 inches by 19 feet long, threaded on both ends, one end for $3\frac{1}{2}$ inches.
- 6 black lock nuts for 2-inch pipe.
- 1 piece galvanized sheet iron, gauge 24, 18 inches by 24 inches.

Total cost of materials, including cutting and threading of pipe, about \$35.00.

This slide differs from slide No. 1 only that in place of using a trough covered with sheet iron for sliding purposes, two pieces of galvanized gas pipe are employed. For all details of construction see description of slide No. 1.

Slide No. 3.**Materials required :**

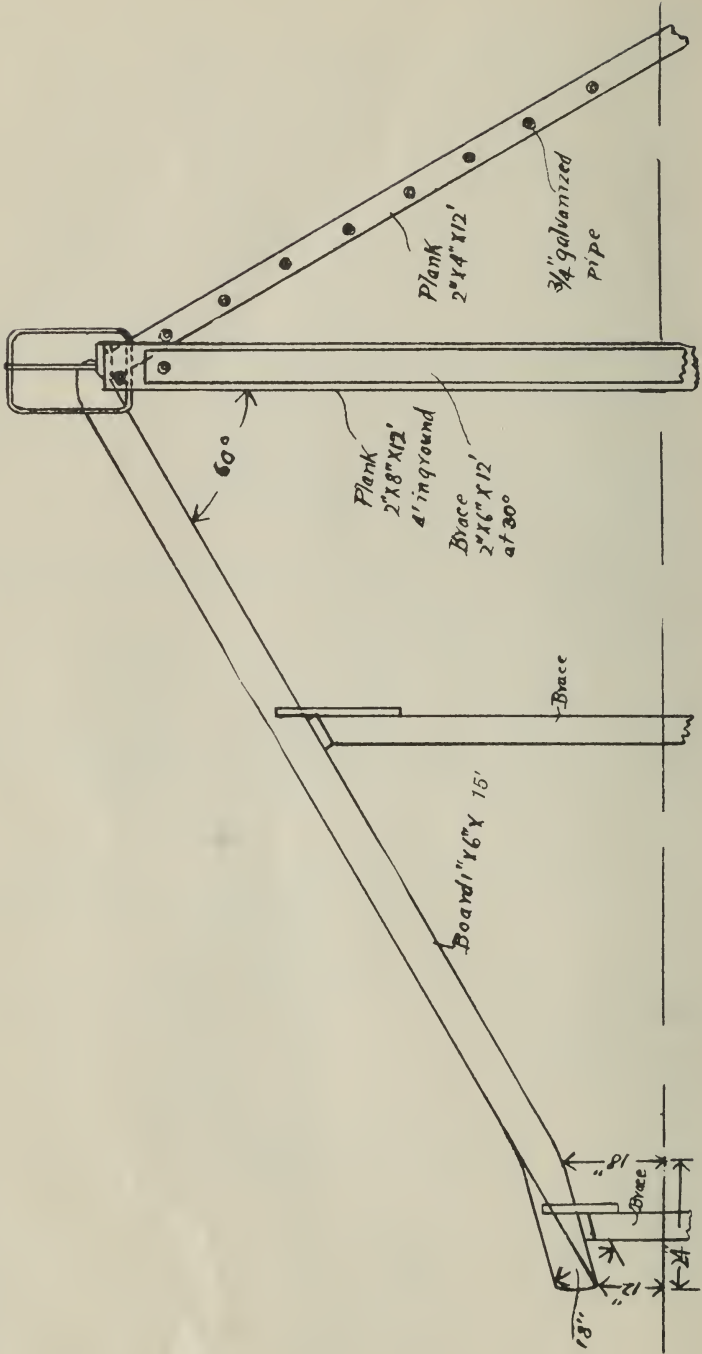
- 2 pieces redwood, 2 inches by 8 inches by 12 feet.
- 2 pieces redwood, 2 inches by 6 inches by 12 feet.
- 2 pieces redwood, 2 inches by 4 inches by 12 feet.
- 2 pieces redwood, 4 inches by 4 inches by 12 feet.
- 1 piece yellow pine, 2 inches by 6 inches by 6 feet.
- 1 piece yellow pine, 2 inches by 4 inches by 6 feet.
- 4 pieces yellow pine, 1 inch by 6 inches by 18 feet.
- 1 piece yellow pine, 1 inch by 6 inches by 3 feet.
- 5 pieces yellow pine, 1 inch by 6 inches by 12 feet.
- 8 pieces galvanized gas pipe $\frac{3}{4}$ inch by 21 inches, threaded $3\frac{1}{2}$ inches on each end.
- 32 black lock nuts for $\frac{3}{4}$ -inch gas pipe.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 61 inches, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 41 inches, threaded on both ends.
- 2 pieces galvanized gas pipe, $\frac{3}{4}$ inch by 21 inches, threaded on both ends, one end 3 inches.
- 4 black lock nuts for $\frac{3}{4}$ -inch pipe.
- 2 galvanized plain tees for $\frac{3}{4}$ -inch pipe.
- 2 galvanized unions for $\frac{3}{4}$ -inch pipe.
- 1 machine bolt, with large washers, 1 inch by 30 inches.
- 8 machine bolts, with washers, $\frac{3}{4}$ inch by 7 inches.
- 4 lag screws, $\frac{3}{4}$ inch by 8 inches.
- 12 carriage bolts, $\frac{1}{2}$ inch by 6 inches.
- 6 carriage bolts, $\frac{1}{2}$ inch by 4 inches.
- 2 gross wood screws, 2-inch, No. 10.
- 1 gross wood screws, $1\frac{1}{4}$ -inch, No. 8.
- 1 gross wood screws, $\frac{3}{4}$ -inch, No. 6.
- 2 pieces galvanized sheet iron, gauge 24, 18 inches by 10 feet.

Total cost of materials about \$28.00.

Slide No. 3 is constructed generally like slide No. 1. It is neither so high nor so steep as the latter, being designed especially for the younger children. Concerning the general details of construction, see the description of slide No. 1.

SLIDE No. 3.

For details of ladder, runway, section of slide and general construction, see Slide No. 1.



Swings.

Material required for a 14-foot beam and three swings :

- 4 pieces redwood, 4 inches by 6 inches by 18 feet.
- 2 pieces redwood, 4 inches by 4 inches by 16 feet.
- 1 piece yellow pine, 4 inches by 6 inches by 14 feet.
- 1 piece yellow pine, $1\frac{1}{4}$ inch by 8 inches by 6 feet.
- 6 eye bolts, with washers, for $\frac{3}{4}$ -inch rope, 7 inches above eye.
- 6 eye bolts with washers, for $\frac{3}{4}$ -inch rope, 2 inches above eye.
- 12 galvanized thimbles for $\frac{3}{4}$ -inch rope.
- 2 machine bolts, 1 inch by 13 inches, with washers.
- 2 carriage bolts, $\frac{1}{2}$ inch by 5 inches.
- 75 feet manila rope, four strands, $\frac{3}{4}$ -inch.

Total cost of material about \$24.00.

This type of construction will be found strong and of easy construction. If the joint made by the main props with the beam is carefully constructed the whole structure can then be erected with comparative ease. Both ends of the rope are braided-in after being run through eye bolts over the thimbles. The swing should hang from 20 inches to 24 inches above the ground. Soak all parts of wood that are placed in the ground in crude oil. All woodwork and black iron should be painted.

Teeter Boards.

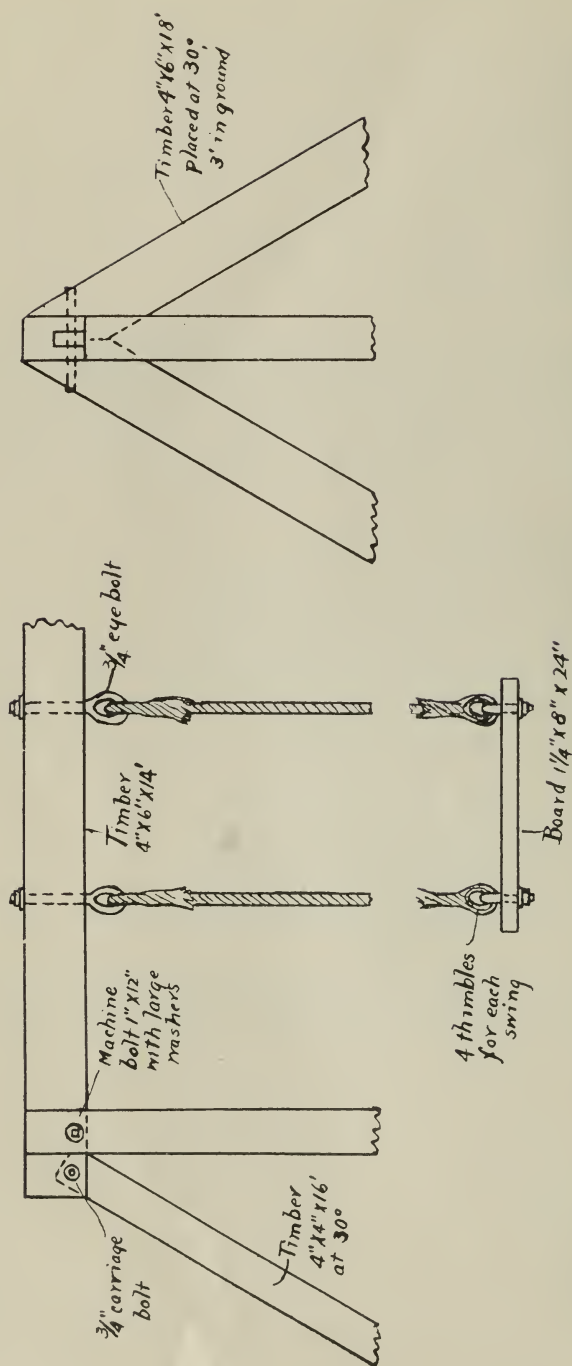
Material required for a set of three boards :

- 2 pieces redwood, 2 inches by 6 inches by 5 feet.
- 1 piece redwood 2 inches by 6 inches by 12 feet.
- 2 pieces redwood, 2 inches by 4 inches by 10 feet.
- 3 pieces yellow pine, 2 inches by 12 inches by 12 feet.
- 6 pieces hardwood for handles, $\frac{3}{4}$ inch by $1\frac{1}{4}$ inches by 10 inches.
- 1 piece galvanized gas pipe, $1\frac{1}{2}$ inches by 12 feet long.
- 6 pieces strap iron, $\frac{1}{4}$ inch by $1\frac{1}{2}$ inches by $13\frac{1}{2}$ inches, made according to drawing.
- 2 pieces strap iron, $\frac{1}{4}$ inch by $1\frac{1}{2}$ inches by 10 inches, made according to drawing.
- 3 pieces thin sheet iron, 2 inches by 12 inches.
- 2 machine bolts with washers, $\frac{3}{4}$ inch by 12 inches.
- 6 carriage bolts with washers, $\frac{1}{2}$ inch by $6\frac{1}{2}$ inches.
- 6 carriage bolts with washers, $\frac{1}{2}$ inch by $4\frac{1}{2}$ inches.
- 6 carriage bolts with washers, $\frac{1}{2}$ inch by 9 inches.
- 26 carriage bolts with washers, $\frac{3}{8}$ inch by $2\frac{1}{2}$ inches.

Total cost of material about \$10.00.

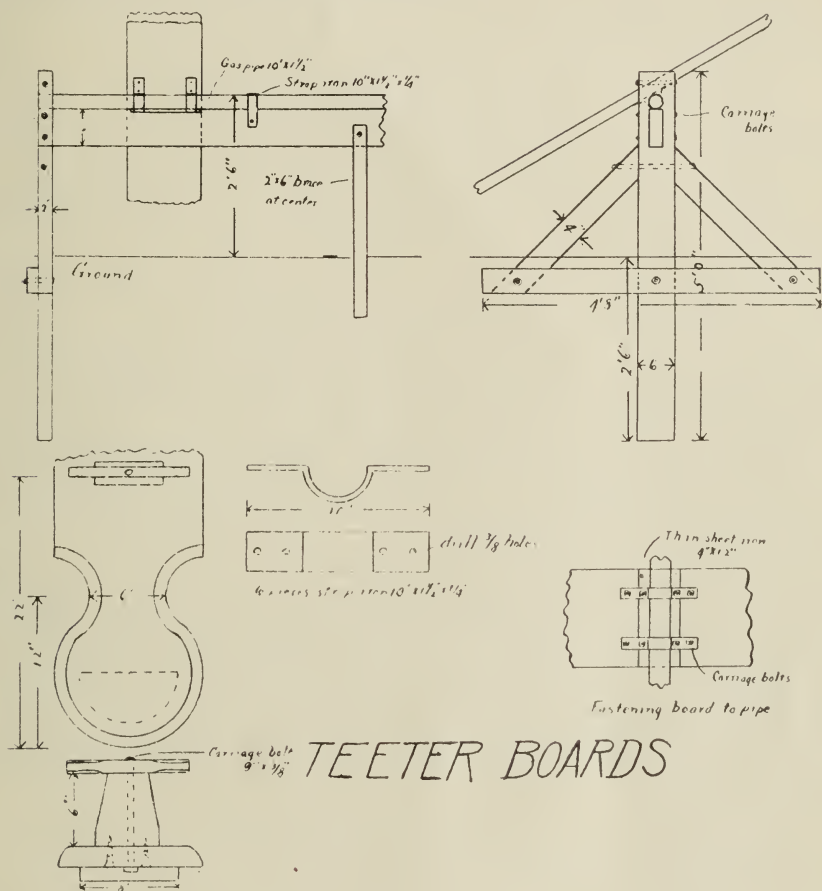
The design here offered is one that is simple of construction and very strong. The shape of the teeter board, as here shown, makes a much more comfortable seat than does the straight board with sharp edges. Soak all parts of wood, to be placed in

SWINGS.



Boards should swing about 22" above ground.
 Beam is about 12' 6" above ground.
 Swings for smaller children may have beam 8' above ground.
 Two swings may be placed in each 8' section, or four in a 16' section.

the ground, in crude oil to give greater length of life. For the use of smaller children, it is desirable that handles be made as indicated, to secure greater safety. This set of teeter boards has been made and is now in use on the grounds of the Normal School and is giving good satisfaction.



TEETER BOARDS

SUGGESTED GROUPS OF APPARATUS, AND COST.

By SOLON W. CUNNINGHAM.

The grouping of the apparatus given below was prompted by requests for advice from school men who had limited means at their disposal for the installation of playground apparatus. One man writes:

"I have \$30.00 to spend upon playground equipment. What piece or pieces can I install that will appeal to all grades and at the same time give a maximum of exercise that is most beneficial to the child?"

Another man has \$125.00 to equip a playground with and wishes to know what pieces of apparatus will give the best all-around service and exercise.

The six suggested groups range in cost from \$30.00 to \$275.00. Each group is designed to give a maximum of beneficial exercise and enjoyment for the money expended. In each group the actual cost of materials, computed from retail prices at the time of the publication of this bulletin, is less than the amount allowed for the group. Please note that no attempt whatever has been made to give the cost of assembling and erecting the apparatus. All of this apparatus can be and should be assembled by the teacher, the older boys, members of the school board and patrons of the school district.

Group No. VI we consider a very efficient group for the school playground and should be the goal in playground equipment that a school district should strive to attain. In many cases all of the pieces can not be installed in one year or in two years. However, with the proper laying out of the ground for all ten pieces and with the addition of two or three pieces each year any school can, in a few years, have a first class playground.

Group No. I. \$30.00.	
Giant stride	\$17 00
Teeter boards (set of three)	10 00
Computed cost	\$27 00

Group No. II. \$65.00.	
Giant stride	\$17 00
Teeter boards (set of three)	10 00
Swings (set of three)	24 00
Horizontal bars (set of three)	9 50
Computed cost	\$60 50

Group No. III. \$100.00.

Giant stride	\$17 00
Teeter boards (set of three)	10 00
Swings (set of three)	24 00
Slide No. 1	35 00
Horizontal bars (set of three)	9 50
Computed cost	<u>\$95 50</u>

Group No. IV. \$125.00.

Giant stride	\$17 00
Teeter boards (set of three)	10 00
Swings (set of three)	24 00
Slide No. 1	35 00
Combination rings	30 00
Computed cost	<u>\$116 00</u>

Group No. V. \$200.00.

Giant stride	\$17 00
Teeter boards (set of three)	10 00
Swings (set of six)	40 00
Slide No. 1	35 00
Slide No. 2	35 00
Teeter ladders (set of three)	22 00
Combination rings	30 00
Computed cost	<u>\$189 00</u>

Group No. VI. \$275.00.

Giant stride	\$17 00
Teeter boards (set of six)	18 00
Swings (set of six)	40 00
Slide No. 1	35 00
Combination rings	30 00
Teeter ladders (set of three)	22 00
Horizontal ladder	19 00
Slide No. 2	35 00
Horizontal bars (set of three)	9 50
Slide No. 3	28 00
Computed cost	<u>\$253 50</u>



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